

REMARKS

Applicant respectfully requests reconsideration of this application, as amended, and consideration of the following remarks. Claims 11 and 17 have been amended. Claims 11-14, 17-20 and 22-30 remain pending. Claims 23-25 and 30 stand rejected under 35 USC 112, first paragraph. Claim 22, stands rejected under 35 USC 112, second paragraph. Claims 11-20 stand rejected as being anticipated under 35 U.S.C. 102(b).

Amendments

Amendments to the Claims

Applicant has amended the claims to more particularly point out what Applicant regards as the invention, specifically, a wafer processing system including at least one surface tension gradient device capable of supporting a process in a liquid meniscus, the surface tension gradient device including a proximity head. The proximity head including a first surface, the first surface having a plurality of flat surface regions, a plurality of source inlets in at least one of the plurality of flat surface regions and a plurality of source outlets in at least one of the plurality of flat surface regions. The wafer processing system also including an in-situ sensor for monitoring a result of the process and a system controller being coupled to the in-situ sensor and the surface tension gradient device, the system controller including a process recipe. No new matter has been added as a result of these amendments or the new claims.

Rejections

Rejections under 35 U.S.C. §112 first paragraph

Claims 23-27 and 29-30 stand rejected under 35 USC 112, first paragraph as failing to comply with the written description requirement. Applicant respectfully traverses these rejections as set forth below.

Regarding the logic limitation of claims 26, 27, 29 and 30, applicant has amended the claims to more clearly reflect the text of the specification, specifically paragraph 117 which states in pertinent part:

“...the sensors 1320A, 1320B can provide feedback to the controller 1302. The controller 1302 can then modify the recipe in response to the feedback from one or more of the sensors...”

Accordingly Applicant has amended claims 26, 27, 29 and 30 to replace the logic limitation with “a capability” limitation.

Regarding claims 23-25 and 30 the question of hydrophobic or hydrophilic properties it is important to note that according to Miriam Webster’s dictionary, the definition of hydrophobic is “lacking affinity for water.” The definition of hydrophilic is “having a strong affinity for water.”

<http://www.m-w.com/cgi-bin/dictionary?book=Dictionary&va=hydrophilic>

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Therefore, hydrophobic or hydrophilic properties are simply a relative statement of a particular material’s affinity for water.

Further, referring to paragraph 89 and 90 of the specification which provide as follows:

[89] “Devices and surfaces such as the proximity heads 106a-5 and 106b-5 that are used in close proximity to the wafer 108 surface or edge and participate in (i.e., bound) one or more of the meniscuses 106a-6 and 106b-6 so as to assist in forming the meniscuses can be more efficient in moving the liquid contents of the meniscuses if an increased surface tension gradient is present. By way of example, the surface tension gradient can be increased when the proximity head has a lower surface tension than the wafer. The surface tension gradient can be greater because the wafer 108 is more hydrophobic than the proximity heads 106a-5 and 106b-5. *A hydrophobic material has less attraction (e.g., higher surface tension) for a selected liquid. A hydrophilic material has a greater attraction (e.g., lower surface tension) for the selected liquid.* By way of example, if the proximity heads 106a-5 and 106b-5 have a lower surface tension (e.g., more hydrophilic) for the liquid contents of the meniscus 106a-6, than the wafer 108, then less of the liquid contents of the meniscus will tend to be left behind on the wafer (i.e., the wafer will be dryer) when the meniscus is moved across the wafer. Maximizing the difference in surface tension (i.e., maximizing the surface tension gradient) will further enhance the drying effect of moving the meniscus from a first surface to a second surface.”

[90] “Therefore *the surface materials of such devices and surfaces can be selected to optimize the relative surface tensions of the devices and surfaces as compared to the wafer 108.* By way of example, *a proximity head having a more hydrophilic property than both the wafer 108 and the edge platform 110 will assist in minimizing the amount*

of liquid that may remain on the wafer as the meniscus is moved across the surface of the wafer.” (Emphasis Added)

Therefore, Applicant submits that claims 23-27 and 29-30 meet the written description requirement of 35 USC 112, first paragraph and respectfully request this rejection be withdrawn.

Rejections under 35 U.S.C. §112 second paragraph

Claim 22, stands rejected under 35 USC 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant respectfully traverses these rejections as set forth below.

Applicant submits that “the liquid meniscus is supported between the surface of the proximity head and a surface of the wafer being processed, wherein the liquid meniscus is in contact with the surface of the proximity head and the surface of the wafer being processed”.

The liquid meniscus is formed and supported by the interaction of the surface of the proximity head, the surface of the wafer being processed and the liquid provided by inlet and a vacuum applied to the outlet ports in the surface of the proximity head. A gas and/or a vapor can also be output by the outlet ports to assist in the formation and maintaining of the liquid meniscus.

Applicant submits that claim 22, as amended is definite and therefore requests the rejection under 35 USC 112, second paragraph be withdrawn.

Rejections under 35 U.S.C. §102(b)

Claims 11-20 stand rejected as being anticipated under 35 U.S.C. 102(b) in view of the Mitsumori reference (US Pat 6,230,722). Applicant respectfully traverses these rejections because as shown in Figures 7A and 7B, the surface of the proximity head 106 includes multiple regions and each of the multiple regions includes

respective sets of inlet ports and outlet ports. Also as shown in Figures 7A and 7B, each of the multiple regions is substantially flat.

Several of Mistumori's embodiments teach structures configured to hold a body of fluid within a pocket 14. If a pocket is not used, only sharp edges are provided by pipe-type ends that do not provide any flat surfaces near the end of the Mitsumori's head, which is proximate to the surface of the substrate. Applicant has amended the claims to better define the structure associated with the proximity head surface that is opposite the surface of the substrate. Particularly, the surface of the proximity head was defined to have flat surface regions. Thus, the plurality of outlet ports for delivering the liquids and gases to the surface of the substrate and the plurality of inlets for removing the liquid from the surface of the substrate extend through the flat surface portions of the surface of the proximity head.

As noted, the teachings of Mitsumori et al. rely on either holding a volume of fluid in a pocket and allowing that volume in the pocket to touch the surface of the substrate or exposure of a fluid from sharp ended heads, that do not teach nor even suggest the flat surfaces of applicant's proximity head.

For completeness, the Applicants would like to point to some of the figures of Mitsumori et al., which include features inconsistent with the now claimed invention. For example, in Mitsumori et al.: Figure 1 (has a pocket 14), Figure 8B (has a larger pocket), Figure 10A (has a pocket 14 and extenders to hold a body of fluid), Figure 16 (has sharp edges and no flat surfaces), Figure 27 (contacts the surface to hold fluid in 114), 31B (has extenders 270 to hold the fluid in the pocket), and Figure 35 (contacts the surface with 230), etc.

Applicant respectfully traverses the rejection as the Mitsumori reference does not teach nor even suggest a wafer processing system comprising at least one surface tension gradient device capable of supporting a process in a liquid meniscus, the surface tension gradient device including a proximity head. The proximity head including a first surface, the first surface having a plurality of flat surface regions, a plurality of source inlets in at least one of the plurality of flat surface regions and a plurality of source outlets in at least one of the plurality of flat

surface regions. The wafer processing system also including an in-situ sensor for monitoring a result of the process and a system controller being coupled to the in-situ sensor and the surface tension gradient device, the system controller including a process recipe.

Accordingly, Applicant respectfully submits that Applicant's invention as claimed in claims 11, 28 and 30 is not anticipated by the Mitsumori reference, and respectfully request the withdrawal of the rejections under 35 U.S.C. §102(b). Dependent claims 12-14, 17-20, 22-27 and 29 depend from one of the independent claims 11 and 28, and are patentably distinct over the cited references for at least the same reasons as the described above for claims 11 and 28 and therefore request the rejections of claims 12-14, 17-20 be withdrawn and claims 11-14, 17-20 and 22-30 be allowed.

SUMMARY

In view of the foregoing amendments and remarks, Applicant respectfully submits that the pending claims are in condition for allowance. Applicant respectfully requests reconsideration of the application and allowance of the pending claims.

If the Examiner determines the prompt allowance of these claims could be facilitated by a telephone conference, the Examiner is invited to contact George B. Leavell at (408) 749-6900, ext 6923.

Deposit Account Authorization

Authorization is hereby given to charge our Deposit Account No. 50-0805 (Ref# LAM2P425) for any charges that may be due or credit our account for any overpayment. Furthermore, if an extension is required, then Applicant hereby requests such extension.

Respectfully submitted,

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